Illuminating Engineering Society

ANSI/IES TM-35-19
+ERRATA 1

TECHNICAL MEMORANDUM:
PROJECTING LONG-TERM CHROMATICITY COORDINATE SHIFT OF LED PACKAGES, ARRAYS, AND MODULES

AN AMERICAN NATIONAL STANDARD

Approved American National Standard
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Prepared by the IES Testing Procedures Committee

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1.1 Introduction

The Illuminating Engineering Society (IES) has defined standard test methods to be used by the manufacturers of LED products to ensure that the products meet the expectations of the lighting community. One of the most important of these is *ANSI/IES LM-80-15, Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules*. LM-80 provides a test and measurement protocol for how these LED light sources in order to document changes in their light and chromaticity characteristics with respect to time. By applying the methodology of *ANSI/IES TM-21-19, Technical Memorandum: Projecting Long Term Lumen Maintenance of LED Light Sources* to a minimum of 6,000 hours of LM-80-compliant test results, it is possible to project the lumen maintenance life (e.g., L_{70}, L_{80}, or L_{90}) of LED packages, arrays, and modules.

In addition to luminous flux, LM-80 also addresses another key photometric parameter, the chromaticity coordinates (often called the "color point") of the LEDs. The initial chromaticity coordinate requirements for white solid-state lighting (SSL) light sources and luminaires are defined in ANSI/NEMA/ANSLG C78.377, Specifications for the Chromaticity of Solid State Lighting Products. Proper selection of LEDs used to build SSL products allows luminaire manufacturers to easily achieve a desired ANSI C78.377-defined chromaticity.

It is important to note that in some applications—such as retail and museum lighting—a characterization of anticipated chromaticity shift of SSL products over their usable lifetime is very important to the user. Further, the chromaticity coordinates of some light sources can change significantly from their initial values over time. This document recommends a method of projecting the shift in chromaticity coordinates of LED packages, arrays, and modules using data obtained during LM-80 testing.

1.2 Scope

This document provides recommendations for projecting long-term chromaticity coordinate stability of LED light sources using data obtained per *ANSI/IES LM-80-15, Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules*.

This method shall only be used for phosphor converted LEDs with initial chromaticity coordinates that fall within the ranges defined for solid state lighting products in ANSI/NEMA/ANSLG C78.377-2017.

This method shall not be used to predict chromaticity shifts in excess of $\Delta u'v' = 0.010$.

2.0 Normative References

2.1 ANSI/IES LM-80-15

Illuminating Engineering Society. Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules. New York: IES; 2015.

2.2 ANSI/NEMA/ANSLG C78.377-2017

National Electrical Manufacturers Association. Specifications for the Chromaticity of Solid-State Lighting Products. Arlington, Virginia: NEMA; 2017.